BSC6459: Fundamentals of Bioinformatics, Sections 25H0, and 25H1-Fall 2015 (2 credits)

BSC6459 (Section 25H0, and 25H1) is an introduction to the basic bioinformatics tools used in computational biology for life science research. The course will use web-based resources that analyze gene and protein sequences as pertinent data examples.

Student Learning Outcomes – After successful completion of this course, students will be able to:

1) Retrieve information on genes and proteins from biological and genomic databases.
2) Predict genes from DNA sequences.
3) Identify promoters and regulatory elements in DNA sequences
4) Analyze protein sequences
5) Compare protein and DNA sequences
6) Visualize and analyze protein structures
7) Construct and interpret simple phylogenies

Lectures/Computer Lab
Online semi-synchronous course: Each week there is a block of content available with specific due dates. Students may view and submit within that window, however, each module is structured to keep the group advancing together.

Instructor: Dr. Valérie de Crécy-Lagard

WebPage: Canvas course link

Contact Information:

- Dr. Valérie de Crécy-Lagard:
  - Email (the most efficient): Use the Canvas e-mail in priority. (If you do not have access to e-learning platform and if emergency, use vcrecy@ufl.edu).
  - Phone: 392 9416 (please leave a message).
  - Office hours: Two 1H online conferencing (times TBA)

- TAs: TBA


Additional book of reference:

“Understanding Bioinformatics” 2008 by Marketa Zvelebil and Jeremy O. Baum Publisher: Garland Science, ISBN: 9780815340249
Evaluation of learning

• Assignments
  - Each lecture will have linked short assignments (10%). These are short exercises that apply the material covered in class and entice to read the pre-class material.
  - Group assignments and discussion (25%). Weekly group assignments will be given but the content will vary. Examples include: 1) reading and discussing papers from the original literature on a subject related to bioinformatics or on a study that combines bioinformatics with experimental data; 2) Creating a tutorial; 3) Peer reviewing of an activity.
  - Mini-projects (15%). These are home-work assignments, usually portions of previous exams to be conducted at home. These will be application questions covering several modules.

• Quizzes and Exams
  - Quizzes (20%)
    Multiple choices or short answer quizzes will be given at the end of each module. The quizzes will be timed and can be taken within a specific window of time.
  - Final (30%)
    A comprehensive take-home exam will be given in the format of application questions that require the correct use of most of the bioinformatics tools covered in class as well as an understanding of the underlying biology.

• Make-up policy. Late assignments will be penalized by deducting 25% of the grade for each day late. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.
• Grading: Straight scale, follows the policies described here https://catalog.ufl.edu/ugrad/current/regulations/info/grades.asp

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The grading scale may be adjusted slightly, based on class performance
Course organization

The module material of a given week will be made available the Friday of the week before. A first batch the assignments will be due on the Tuesday and the rest on the Friday of a given module Week. Due dates might be different for Mini Projects.

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<tr>
<th>Lecture</th>
<th>Textbook Title</th>
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**Module 1 (week 1)**
L0    Getting started  
Group activity and syllabus quiz
L1    EB1  Bioinformatics: Definition and overview
L2    EB2  Biological database
Week 1 Group Activity and Module Quiz

**Module 2 (week 2)**
L3    EB3  Information retrieval from databases I
L4    EB3  Information retrieval from databases II
Week 2 Group Activity and Module Quiz

**Module 3 (week 3)**
L5    EB3-4  Pairwise alignment, an overview
L6    EB3-4  Pairwise alignment and database searching
Week 3 Group Activity and Module Quiz

**Module 4 (week 4)**
Mini project 1 due
L7    EB5-7  Multiple Sequence Alignment; Remote Homology Detection
L8    EB5-7  Multiple Sequence Alignment; Remote Homology Detection
Week 4 Group Activity and Module Quiz

**Module 5 (weeks 5-6)**
Week 5
L9    EB8&17  Genome browsers
L10   EB8  Predicting genes in prokaryotes
Week 5 Group activity

**Week 6**
L11   EB9  Identifying plant genes
L12   EB8-9  Promoter and Regulatory site prediction
Week 6 Group Activity and Module Quiz

**Module 6 (week 7)**
L13   EB8-9  Practical DNA analysis
L14   EB8-9  Protein analysis
Week 7 Module Quiz

**Module 7 (week 8)**
Mini project 2 due
L15   EB10-11  Phylogeny Basics
L16   EB10-11  Phylogeny Basics
Week 9 Module Quiz

**Module 8 (week 9)**
Mini project 3 due
L17   EB12-13  Visualizing and comparing Protein structures
L18   EB12-14  Visualizing and comparing Protein structures
Week 10 Group Activity and Module Quiz

**Module 9 At Home Final Exam (week 10)**

EB= Essential Bioinformatics
**Academic Honesty:** UF students are bound by the Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor of TAs in this class. It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor. This policy will be vigorously upheld at all times in this course.

**Software Use:** All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

**Online Course evaluations:** Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu

**Campus Helping Resources:** Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- **University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,** [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)
- **Career Resource Center, First Floor JWRU, 392-1601,** [www.crc.ufl.edu/](http://www.crc.ufl.edu/)
  - [www.crc.ufl.edu/](http://www.crc.ufl.edu/)
- **Emergencies, University Police Department: 392-1111 or 9-1-1**

**Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Student Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)